

UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

Page 1 of 1

PATENT NO. : 6,877,781

APPLICATION NO.: 10/632,457

ISSUE DATE : April 12, 2005

INVENTOR(S) : EDLER, David

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Claim 1, line 9, after "corrugation" insert - - and substantially perpendicular to a longitudinal axis of said fitting - -.

Claim 8, line 9, after "corrugation" insert - - and substantially perpendicular to a longitudinal axis of said fitting - -.

Claim 8, line 27, before "edge" insert - - sharp - -.

Claim 6, line 1, before "edge" insert - - sharp - -.

Claim 7, line 1, before "edge" insert - - sharp - -.

Claim 10, line 9, after "tubing" insert - - the axially facing surface being substantially perpendicular to a longitudinal axis of the tubing - -.

MAILING ADDRESS OF SENDER (Please do not use customer number below):

Stephan P. Gribok, Duane Morris LLP
30 South 17th Street
Philadelphia, PA 19103-4196

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.0 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Attention Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re: Application of: EDLER, David

Serial No: 10/632,457

Examiner: Hewitt, J.

Filing Date: July 31, 2003

Group Art Unit: 3679

Patent: 6,877,781, granted April 12, 2005

For: CORRUGATED TUBE FITTING

Conf. No. 3808

Request for Certificate of Correction, 37 C.F.R. §1.322 (Office Mistake)

Attention: Certificate of Correction Branch
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

The undersigned on behalf of the patent owner of record, Highlands Corporation, requests issue of a Certificate of Correction to correct a mistake of the Office. A proposed form of Certificate of Correction is attached. No fee is required.

The error is that the printed patent fails to reflect entry of the Examiner's Amendment that was attached to the Notice of Allowance mailed October 1, 2004. Attached are copies of the claims that were pending in the application at the time of the Examiner's Amendment, the Examiner's Amendment stating the changes made to the claims, and columns 9 and 10 of the patent, which together disclose the error.

Respectfully submitted,

Date: September 16, 2009

/Stephan Gribok/
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Docket No.: D4861-00040

Notice of Allowability

Application No.

10/632,457

Examiner

James M Hewitt

Applicant(s)

EDLER, DAVID

Art Unit

3679

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the amendment filed 5/10/04.
2. ☒ The allowed claim(s) is/are 1, 5-10, 3-4, 18 and 20 renumbered as 1-11 respectively.
3. ☐ The drawings filed on _____ are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
 - * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☒ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☒ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☒ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date 2/4/04
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413),
Paper No./Mail Date _____.
7. ☒ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

J M H
7/19/04

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Stephan Gribok on 7/19/04.

The application has been amended as follows:

In claim 1 line 7, the phrase --and substantially perpendicular to a longitudinal axis of said fitting-- has been inserted after "corrugation".

In claim 3 line 8, the phrase --and substantially perpendicular to a longitudinal axis of said fitting-- has been inserted after "corrugation".

In claim 3 line 23, --sharp-- has been inserted before "edge".

In claim 9 line 1, --sharp-- has been inserted before "edge".

In claim 10 line 1, --sharp-- has been inserted before "edge".

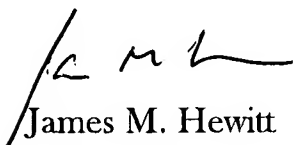
In claim 18 line 8, the phrase --the axially facing surface being substantially perpendicular to a longitudinal axis of the tubing-- has been inserted after "tubing".

Art Unit: 3679

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James M Hewitt whose telephone number is 703-305-0552. The examiner can normally be reached on M-F, 930am-600pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Daniel Stodola can be reached on 703-308-2686. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



James M. Hewitt
Patent Examiner
Technology Center 3600

What is claimed is:

1 1(currently amended). A fitting for an end of a length of tubing
2 having corrugations ranging between a maximum diameter and a minimum
3 diameter, the fitting comprising:
4 a retainer having at least one ridge sized to extend inwardly to a radius
5 between said maximum and minimum diameters for gripping the tubing axially
6 above an endmost corrugation of the tubing, **wherein the retainer has a flat**
7 **axially facing surface disposed above said endmost corrugation;**
8 a body having a hollow cylindrical part sized to admit the retainer, the
9 body having at least one threaded surface;
10 a nut having a thread complementary with the threaded surface of the
11 body, the nut having a cap part configured to engage the retainer for urging the
12 retainer axially into the body with threaded advance of the nut relative to the
13 body;
14 wherein the body has an inwardly tapered conical surface with a circular
15 outer radius surrounded by an annular groove, **thereby defining a sharp edge**
16 **opposed to the axially facing surface of the retainer,** and wherein the **sharp**
17 edge is disposed between said maximum and minimum diameters **and a**
18 **circular nip is formed between the sharp edge and the axially facing**
19 **surface of the endmost corrugation, and tightened by** ~~whereby advance~~
20 of the nut on the body ~~turns the endmost corrugation over said edge.~~

Claim 2 is now canceled, without prejudice.

1 3(currently amended). **A fitting for an end of a length of tubing**
2 **having corrugations ranging between a maximum diameter and a**
3 **minimum diameter, the fitting comprising:** ~~The fitting of claim 2, wherein~~
4 **a retainer having at least one ridge sized to extend inwardly to a**
5 **radius between said maximum and minimum diameters for gripping the**
6 **tubing axially above an endmost corrugation of the tubing, wherein the**

7 retainer has a flat axially facing surface disposed above said endmost
8 corrugation;

9 a body having a hollow cylindrical part sized to admit the retainer,
10 the body having at least one threaded surface;

11 a nut having a thread complementary with the threaded surface of
12 the body, the nut having a cap part configured to engage the retainer for
13 urging the retainer axially into the body with threaded advance of the nut
14 relative to the body;

15 wherein the body has an inwardly tapered conical surface with a
16 circular outer radius surrounded by an annular groove, thereby defining a
17 sharp edge opposed to the axially facing surface of the retainer, wherein
18 the sharp edge is disposed between said maximum and minimum
19 diameters and a circular nip is formed between the sharp edge and the
20 axially facing surface of the endmost corrugation, and tightened by
21 advance of the nut on the body;

22 a compressible gasket disposed in the annular groove;

23 wherein the edge is configured to form the endmost corrugation into a
24 rolled bead adjacent to between the maximum diameter and the nip between
25 the sharp edge and the axially facing surface of the retainer, and wherein
26 the bead compresses the gasket downwardly in the annular groove
27 surrounding the sharp edge.

1 4(currently amended). The fitting of claim 3 2, wherein the gasket
2 comprises a ~~high-temperature~~ gasket material capable of withstanding high
3 temperatures.

1 5(original claim). The fitting of claim 1, wherein the fitting body has a
2 second threaded surface bearing a pipe thread.

1 6(original claim). The fitting of claim 1, wherein the ridge of the
2 retainer is circumferentially split to enable engagement over the maximum
3 diameter.

1 7(original claim). The fitting of claim 6, wherein the retainer comprises
2 a plurality of ridges that are complementary with the corrugations of the tubing,
3 and a flanged part that is positioned for engagement with a flanged part of the
4 nut.

1 8(currently amended). The fitting of claim 1, wherein the conical
2 surface of the fitting and the annular groove form a triangular cross section with
3 a radially sloped side and a longitudinal side forming a right triangle and a
4 corner of the triangle forms said sharp edge.

1 9(original claim). The fitting of claim 1, wherein the edge is placed to
2 fall between 40% and 60% of a radial distance between the maximum and
3 minimum diameters.

1 10(original claim). The fitting of claim 1, wherein the edge is placed to
2 fall substantially at a midpoint between the maximum and minimum diameters.

Claims 11-17 are now canceled.

1 18(currently amended). A method of terminating a length of
2 corrugated tubing comprising the steps of:
3 cutting the tubing at a longitudinal point spaced between maximum
4 diameter points of adjacent corrugations, thereby forming an endmost
5 corrugation;

6 engaging the tubing in a retainer having a ridge placed axially behind the
7 ~~at least an~~ endmost corrugation of the tubing, the ridge having a surface
8 facing axially toward a cut end of the tubing;

9 forcing the endmost corrugation axially against an inwardly conical
10 surface having an edge surrounded by an annular groove, the edge being
11 disposed between the maximum and minimum diameters **and oriented to**
12 **oppose the axially facing surface of the ridge of the retainer behind the**
13 **endmost corrugation so as to form a sharp circular nip**, thereby folding the
14 endmost corrugation over the edge **to form a bead around the nip and to**
15 ~~provide~~ a circular sealing junction between the retainer and the edge.

Claim 19 is now cancelled.

1 20(currently amended). The method of claim **18** ~~19~~, further comprising
2 forming a supplemental seal with the bead by placing a gasket in the annular
3 groove, the gasket being compressed by the bead.

The invention has among its advantages the provision of both a metal-to-metal and high temperature gasket or O-ring seal in one arrangement and in a manner wherein the two seals rely in part on one another's structures. The triangular profile of the seal leading to the edge produces a thin point of sealing contact at which high pressure can be concentrated. The conical surface leading up to the edge has the further benefit of diverting any burr on the cut end of the endmost corrugation away from the gasket, preventing damage during assembly.

The inventive fitting can be disassembled and reattached because the sealing structures are not generally damaged during assembly. The re-assembly steps can involve forming a new cut end on the tubing, so as to rely on a different endmost corrugation. Alternatively, the seal can be reused because the provision of both a metal/metal and a supplemental gasket seal reduce the potential for leakage without relying wholly on either form of seal.

The fitting is effective and not unduly expensive. Its components are small and compact, requiring less assembly time and producing a good seal at modest tightening torque.

The invention having been disclosed in connection with certain preferred arrangements, variations within the scope of the invention will now become apparent to persons skilled in the art. The invention is not intended to be limited only to the embodiments specifically described as examples, and accordingly, reference should be made to the appended claims to assess the scope of the invention in which exclusive rights are claimed.

What is claimed is:

1. A fitting for an end of a length of tubing having corrugations ranging between a maximum diameter and a minimum diameter, the fitting comprising:

a retainer having at least one ridge sized to extend inwardly to a radius between said maximum and minimum diameters for gripping the tubing axially above an endmost corrugation of the tubing, wherein the retainer has a flat axially facing surface disposed above said endmost corrugation;

a body having a hollow cylindrical part sized to admit the retainer, the body having at least one threaded surface;

a nut having a thread complementary with the threaded surface of the body, the nut having a cap part configured to engage the retainer for urging the retainer axially into the body with threaded advance of the nut relative to the body;

wherein the body has an inwardly tapered conical surface with a circular outer radius surrounded by an annular groove, thereby defining a sharp edge opposed to the axially facing surface of the retainer, wherein the sharp edge is disposed between said maximum and minimum diameters and a circular nip is formed between the sharp edge and the axially facing surface of the endmost corrugation, and tightened by advance of the nut on the body.

2. The fitting of claim 1, wherein the fitting body has a second threaded surface bearing a pipe thread.

3. The fitting of claim 1, wherein the ridge of the retainer is circumferentially split to enable engagement over the maximum diameter.

4. The fitting of claim 3, wherein the retainer comprises a plurality of ridges that are complementary with the corrugations of the tubing, and a flanged part that is positioned for engagement with a flanged part of the nut.

5. The fitting of claim 1, wherein the conical surface of the fitting and the annular groove form a triangular cross section

with a radially sloped side and a longitudinal side forming a right triangle and a corner of the triangle forms said sharp edge.

6. The fitting of claim 1, wherein the edge is placed to fall between 40% and 60% of a radial distance between the maximum and minimum diameters.

7. The fitting of claim 1, wherein the edge is placed to fall substantially at a midpoint between the maximum and minimum diameters.

8. A fitting for an end of a length of tubing having corrugations ranging between a maximum diameter and a minimum diameter, the fitting comprising:

a retainer having at least one ridge sized to extend inwardly to a radius between said maximum and minimum diameters for gripping the tubing axially above an endmost corrugation of the tubing, wherein the retainer has a flat axially facing surface disposed above said endmost corrugation;

a body having a hollow cylindrical part sized to admit the retainer, the body having at least one threaded surface;

a nut having a thread complementary with the threaded surface of the body, the nut having a cap part configured to engage the retainer for urging the retainer axially into the body with threaded advance of the nut relative to the body;

wherein the body has an inwardly tapered conical surface with a circular outer radius surrounded by an annular groove, thereby defining a sharp edge opposed to the axially facing surface of the retainer, wherein the sharp edge is disposed between said maximum and minimum diameters and a circular nip is formed between the sharp edge and the axially facing surface of the endmost corrugation, and tightened by advance of the nut on the body;

a compressible gasket disposed in the annular groove; wherein the edge is configured to form the endmost corrugation into a rolled bead between the maximum diameter and the nip between the sharp edge and the axially facing surface of the retainer, and wherein the bead compresses the gasket downwardly in the annular groove surrounding the sharp edge.

9. The fitting of claim 8, wherein the gasket comprises a gasket material capable of withstanding high temperatures.

10. A method of terminating a length of corrugated tubing comprising the steps of:

cutting the tubing at a longitudinal point spaced between maximum diameter points of adjacent corrugations, thereby forming an endmost corrugation;

engaging the tubing in a retainer having a ridge placed axially behind the endmost corrugation of the tubing, the ridge having a surface facing axially toward a cut end of the tubing;

forcing the endmost corrugation axially against an inwardly conical surface having an edge surrounded by an annular groove, the edge being disposed between the maximum and minimum diameters and oriented to oppose the axially facing surface of the ridge of the retainer behind the endmost corrugation so as to form a sharp circular nip, thereby folding the endmost corrugation over the edge to form a bead around the nip and a circular sealing junction between the retainer and the edge.

11. The method of claim 10, further comprising forming a supplemental seal with the bead by placing a gasket in the annular groove, the gasket being compressed by the bead.